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Spider mites, soybean aphids, and summer temperature

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INTEGRATED CROP MANAGEMENT

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Temperatures in the high 90s and low 100s have prompted questions about how this will affect pests in soybeans. Spider mites typically flourish in hot, dry weather. Fungal pathogens that suppress spider mites during high humidity and mild temperatures are less effective against mites during very dry and hot conditions. Therefore, spider mites may be a greater concern this year during early August than soybean aphids.

[1]
Spider mite injury causes small yellow spots called stippling. (Marlin E. Rice)

Fields with spider mites should have three conditions met before the field is sprayed. First, live spider mites should be present. Check for spider mites by knocking the upper soybean leaves against a piece of white paper or a paper plate. Second, leaves must have "stippling" or small yellow spots. This is an indication of feeding by spider mites. Third, very dry or drought conditions are being experienced or are forecasted in the next week. Spider mite

populations typically increase when soybeans are under drought stress.

An additional consideration before spider mites are sprayed is the choice of insecticide. Numerous insecticides are labeled for soybeans, but the pyrethroids (Asana®, Baythroid®, Pounce®, and Warrior®) sometimes make spider mite problems worse by eliminating all the beneficial insects while not killing all the spider mites. The result can be spider mite populations that are larger after the insecticide application than before. Spider mites are best controlled in soybeans by using an organophosphate (dimethoate or Lorsban®, or its generic equivalent).

Soybean aphids, in contrast, are not favored by hot, dry weather conditions. A study at the University of Minnesota examined soybean aphid response to a range of constant temperatures in environmental chambers. The results are shown in the table, but it must be emphasized that the study conditions did not include fluctuating temperatures that would be expected in the field during oscillating nighttime and daytime conditions. Results under field conditions could be markedly different.

However, what the Minnesota study did find is that soybean aphids do not respond well to hot temperatures. In general, as the temperature increased, the survivorship of soybean aphids decreased. All soybean aphid nymphs held at a constant 95 °F died within 11 days and did not reproduce. The optimal temperature for development was 82 °F at which the time from birth to first reproduction was 4.5 days, again under constant temperatures. Based on what we have experienced during July, it appears that the soybean aphid is not going to develop into widespread problems where the populations exceed the economic threshold of 250 aphids per plant on 80 percent of the plants.

Spider mites may be the primary consideration in many Iowa soybean fields during early August. The hot, dry weather conditions favor this pest while hampering the soybean aphid. Consider the above conditions before making any insecticide application.

Soybean Aphid Response to Temperature*	**Temperature °F**
Lower developmental threshold (no development below this point)	48
Fastest doubling time	77
Optimal developmental rate	82
Reduced net reproduction (30%)	84-94
Upper developmental threshold (reduced survivorship and no reproduction)	95

*Laboratory study based on constant temperatures. McCornack et al. 2004. *Journal of Economic Entomology* 97:854-861.

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Links:
[1] http://www.ipm.iastate.edu/ipm/icm/node/634

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